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EXAMINER

WITKOWSKI, ALEXANDER C

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/577,896	Applicant(s) HACK ET AL.	
	Examiner ALEXANDER C. WITKOWSKI	Art Unit 2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5,6,9-14,17,18,21 and 22 is/are rejected.
- 7) ☒ Claim(s) 3,4,7,8,15,16,19 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' submission filed on 12/22/2008 has been entered.

Allowable Subject Matter

2. Apparatus claims 3, 4, 7, and 8 and method claims 15, 16, 19, and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 10 - 14, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Courian et al. (US 6,527,370).

With respect to claim 1, Courian et al. teaches an inkjet print head (Fig.1: 80) comprising at least one nozzle chamber (Fig.2: 160), having a nozzle aperture (Fig.1: 104) defined in one wall thereof for the ejection of printing fluid out of said aperture, and a printing fluid supply channel (Fig.1: 54) interconnected with said nozzle chamber (Fig.2: 160), and a printing fluid droplet tail release guide arrangement (col.13, lines 1-6: disclosing counter-bore [nozzle aperture] on the top surface [one wall of nozzle chamber] of the orifice-plate member) having disposed on a predetermined position of an edge of a circumference of said aperture (col.13, lines 1-6: disclosing that a counter-bore on the top surface of the orifice-plate member [predetermined position of an edge of a circumference of the aperture] control tail break-off of expelled ink-jet droplets).

With respect to claim 2, Courian et al. teaches wherein said printing fluid droplet tail release guide arrangement comprises a pointed burr like element the point of which is directed inwards of said aperture (Fig.13: showing tail break-off location [printing fluid droplet tail release guide arrangement] with bottom wall [pointed burr like element whose point is directed inwards] 276; see col.45, lines 5-13: disclosing that laser-ablated bore holes have burrs on the exit-side edge [a pointed burr like element the point of which is directed inwards of said aperture]).

With respect to claim 10, Courian et al. teaches wherein said printing fluid droplet tail release guide arrangement comprises a recessed section of essentially rectangular shape (Fig.14; col.43, lines 36-39: disclosing square / rectangular counter-bore)

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extending from said aperture (Fig.1: 104) inwards along an inner surface wall of said nozzle chamber (col.43, lines 36-39).

With respect to claim 11, Courian et al. teaches a print cartridge body (claim 9); a fluid reservoir (claim 9); and an inkjet print head (Fig.1: 80) according to claim 1.

With respect to claim 12, Courian et al. teaches an inkjet printing device (Fig.21), comprising an inkjet print head (Fig.1: 80) according to claim 1.

Method claims 13, 14, and 22 recite the same limitations of 102 rejected claims 1, 2, and 10. Therefore, claims 13, 14, and 22 are also rejected for the same reasons.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 5, 6, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Courian et al. (US 6,527,370) in view of Weber et al. (6,527,369).

With respect to claim 5, Courian et al. teaches all the limitations of claim 1 above.

However, Courian et al. does not teach that said printing fluid droplet tail release guide arrangement comprises a pointed burr like element the point of which is directed outwards of an aperture.

Weber et al. teaches that said printing fluid droplet tail release guide arrangement comprises a pointed burr like element the point of which is directed outwards (Weber et al.: Fig.10: showing cusped orifice directed outwards) of an aperture (Fig.10: 1003).

It would have been obvious to one of ordinary skill in the art at the time this invention was made to modify Courian et al. to have a nozzle with a pointed burr like element the point of which is directed outwards of an aperture as taught by Weber et al. because such a nozzle would cause the printing fluid droplet tail to be severed at a predictable location from the orifice (Abstract: lines 1-4).

With respect to claim 6, Courian et al. teaches all the limitations of claim 1 above.

However, Courian et al. does not teach that said printing fluid droplet tail release guide arrangement comprises an essentially saw tooth shaped section arranged at a portion of said edge of said circumference of an aperture.

Weber et al. teaches that said printing fluid droplet tail release guide arrangement comprises an essentially saw tooth shaped section arranged at a portion of said edge of said circumference (Weber et al.: Fig.11: showing multiple-cusp orifice) of an aperture (Fig.11: 1103).

It would have been obvious to one of ordinary skill in the art at the time this invention was made to modify Courian et al. to have a nozzle with an essentially saw tooth shaped section arranged at a portion of said edge of said circumference of an aperture as taught by Weber et al. because such a nozzle results in improved edge roughness and improved quality of print (Abstract: lines 1-4).

Method claims 17 and 18 recite the same limitations of 103 rejected claims 5 and 6. Therefore, claims 17 and 18 are also rejected for the same reasons.

7. Claims 9 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Courian et al. (US 6,527,370) in view of Umehara (US 6,878,298).

With respect to claim 9, Courian et al. teaches all the limitations of claim 1 above.

However, Courian et al. does not teach that said printing fluid droplet tail release guide arrangement comprises a recessed section of essentially hemispherical shape in an inner surface wall of a nozzle chamber a chord of which rests in the plane of an aperture and an arc of which extend inwards of a nozzle chamber.

Umehara teaches that said printing fluid droplet tail release guide arrangement comprises a recessed section of essentially hemispherical shape in an inner surface wall of a nozzle chamber (Umehara: Fig.3: 33, 37, 41) a chord of which rests in the plane of an aperture (Umehara: 33, 37, 41) and an arc of which extend inwards (Umehara: Fig.4: 33a, 33b) of a nozzle chamber.

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It would have been obvious to one of ordinary skill in the art at the time this invention was made to modify Courian et al. to have a nozzle with a recessed section of essentially hemispherical shape in an inner surface wall of a nozzle chamber a chord of which rests in the plane of an aperture and an arc of which extend inwards of a nozzle chamber as taught by Umehara because such a nozzle results in a pressure generating cavity that prevents stagnation of ink flow and formation of vapor bubbles (col.16, lines 64-66).

Method claim 21 recites the same limitations of 103 rejected claim 9. Therefore, claim 21 is also rejected for the same reasons.

Response to Arguments

(a) Applicants argue in the reply of Office Action mailed March 26, 2008, that Applicant asserted that Courian does not teach the provision of a printing fluid droplet tail release guide arrangement having a predetermined position at an edge of a circumference of a nozzle aperture. Applicant gave an example of Courian's disclosure to explain this assertion. The example is about a non-concentric counter-bore in respect to an ink-transfer bore. However, Applicant did not intend to exclude a concentric case, just did not mention that. The counter-bore concentric or non-concentric to the ink-transfer bore has nothing to do with the features of the present application. What Courian discloses is providing a combination of the counter-bore and the ink-transfer bore. When the counter-bore is formed to be concentric or non-concentric in respect to the ink-transfer bore, or the counter-bore is symmetrical, asymmetrical, or partial, it is able to control the tail break-off expelled ink-jet droplets. Courian does not provide an "additional" guide element or arrangement as the present application does. Moreover, Courian does not provide any guide element or arrangement that locates at the circumferential edge of the nozzle aperture and is specified with a predetermined position at that edge.

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Examiner responds to Applicants' argument (a) by respectfully noting that Applicants' claim 1 does not claim an "additional" guide element; nor does Applicants' specification disclose either "guide element" nor "additional" guide element. Courian et al. discloses control of tail droplet trajectory by control of tail break-off when a side wall is removed (col.13, lines 1-14). Thus the examiner believes that Courian et al. discloses a droplet tail release guide arrangement having a predetermined position of an edge of a circumference of the aperture, according to the language of Applicants' claim 1, and as cited in the rejections above.

(b) Applicants argue that, in the reply of Office Action mailed March 26, 2008, Applicant asserted that Courian does not mention provision of any element of a specific shape at the circumferential edge of the bore. According to the descriptions of Courian (col. 8, lines 26-39, col. 27, line 24 to col. 29, line 56 and FIG. 5), Courian mentions a "recess" 262, which corresponds to the "counter-bore" described in following descriptions. Courain mentions that the cross-sectional configuration of the recess may be any shape such as triangular. As can be understood, what Courain discusses is the profile of the whole counter-bore, rather than provision of any element with an essentially triangular or pyramidal cross-section.

Examiner responds to Applicants' argument (b) by concurring that Courian et al.'s disclosure of square, oval, triangular, circular, pentagon, regular, or irregular shapes is also described as recess 262.

(c) Applicants argue that, to be more specifically pointed out that the printing fluid droplet tail release guide arrangement of the present application is an "additional" guide element or arrangement, "a printing fluid droplet tail release guide arrangement [4] at a predetermined position at an edge of a circumference of said aperture [3]" in the original claim 1 and 13 is amended as "a printing fluid droplet tail release guide arrangement [4] disposed on a predetermined position of an edge of a circumference of said aperture [3]". This amendment is apparently within the support of original specification and drawings.

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Examiner responds to Applicants' argument (c) by noting that Applicants' specification does not disclose an "additional" guide element or arrangement. This concept is without obvious support in the specification or original claims.

(d) Applicants argue that, regarding claim 1, the Examiner cites col. 13, lines 1-6 to indicate that Courian teaches a printing fluid droplet tail release guide arrangement disposed on a predetermined position of an edge of a circumference of a nozzle aperture. In this description of Courian, it is described that a counter-bore on the top surface of the orifice-plate member controls tail break-off of expelled ink-jet droplets. However, the counter-bore is a part of the nozzle aperture on the exit edge. Because of the shape or profile of the counter-bore, tail break-off of expelled ink-jet droplets is controlled. The shape or profile of the counter-bore is similar to the variance of the nozzle aperture on the exit edge. Therefore, Courian does not disclose an "additional" guide element or arrangement provided as the present application. Moreover, in the present application, the printing fluid droplet tail release guide arrangement is defined with a position that is chose from the circumferential edge of nozzle aperture. However, the position information of counter-bore is to determine which aperture of the orifice-plate member the counter-bore locates on. It is quite different from provision of a position limitation on the circumferential edge of the nozzle aperture to define the printing fluid droplet tail release guide arrangement. Therefore, Courian does not teach a printing fluid droplet tail release guide arrangement disposed on a predetermined position of an edge of a circumference of the nozzle aperture as claimed in the claim 1 of the subject application. Courian's way to solve the problem of droplet tail is different from that claimed in the claim 1 of the present application.

Examiner responds to Applicants' argument (d) by noting that Applicants' specification does not disclose an "additional" guide element or arrangement. This concept is without obvious support in the specification or original claims.

(e) Applicant argues that, regarding claim 2, the Examiner cites col. 45, lines 5-13 to indicate that Courian teaches "a pointed burr like element", the point of which is directed inwards of the aperture. In this description of Courian, it is described that laser-ablated bore holes have burrs on the exit-side edge. In FIG. 13, Courian also shows a bottom wall 276 having burrs as the exit-side edge. However, the laser ablation will cause the bore hole to have burrs all around the exit-side wall. The burrs resulted from the laser ablation can not guide a tail of a printing fluid droplet in a fixed direction as the pointed burr like element claimed in claim 2 does. Therefore, Courian does not disclose any pointed burr like

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element as a printing fluid droplet tail release guide arrangement disposed on a predetermined position of the edge of the circumference of the aperture as claimed in claim 2 and shown in FIG. 2 of the subject application.

Examiner responds to Applicants argument (e), by noting that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.\

Courian et al. discloses that burrs on the exit opening of laser-ablated nozzles have burrs. Thus ordinary print head manufacturing techniques anticipate Applicants' claimed burr-like printing fluid droplet tail release, regardless of whether that is a purpose for the laser-ablated nozzle burrs.

(f) Applicants argue that, regarding claims 3 and 4, the Examiner cites col. 8 line 32-37, FIGs. 1,2 and 17 to indicate that Courain teaches a bar of essentially triangular cross-section, or a pointed structure of essentially pyramidal shape, a base of which rests on an inner surface of the nozzle chamber and a pointed edge of which protrudes towards the center of the aperture, and the bar further extending along said inner surfaces inward of the nozzle chamber. However, according to the descriptions of Courian (col. 8, lines 26-39, col. 27, line 24 to col. 29, line 56 and FIG. 5), Courian mentions a "recess" 262, which corresponds to the "counter-bore" described in following descriptions. Courain mentions that the cross-sectional configuration of the recess may be any shape such as triangular. As can be understood, what Courain discusses is the profile of the whole counter-bore, rather than provision of any element with an essentially triangular or pyramidal cross-section. FIG. 17 of Courian discloses that a portion of the topside surface of the orifice-plate structure is not removed, so that the counter-bore is only a partial counter-bore is created. Courain does not disclose a bar of essentially triangular cross-section or a pointed structure of essentially pyramidal shape provided at the aperture edge.

Examiner responds to Applicants' argument (f) by concurring with Applicants that Courain et al.'s triangular counter-bore / recess would not create a bar of essentially

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triangular cross-section or a pointed structure of essentially pyramidal shape provided at the aperture edge.

(g) Applicants argue that, regarding claims 7, 8, 10, as discussed above, the "recess" mentioned in Courian in fact indicates the counter-bore. The cross-section of the counter-bore can be various shapes. That is, the edge of the circumference of the aperture can be formed as any desired shape. Courian does not mentions any recess formed in the inner surface wall of the nozzle chamber.

Examiner responds to Applicants' argument (g) by observing that any of Courian et al's rectangular, triangular, square, and pentagon would necessarily form a recess in the inner surface wall of the nozzle chamber.

(h) Applicants argue that, regarding claim 5, the Examiner indicates that Weber discloses that the printing fluid droplet tail release guide arrangement comprises a pointed burr like element, the point of which is directed outward of the aperture. As shown in FIG. 10 of Weber, the whole profile of the aperture is egg-shape. That is, Weber varies the profile of the aperture into specific shapes as shown FIG.10 and FIG. 11, for example. There is NO printing fluid droplet tail release guide arrangement provided at a specific position of the circumferential edge of the aperture. According to the subject application, the basic shape of the aperture is not entirely changed, instead, a printing fluid droplet tail release guide arrangement is locally provided at a specific position of the aperture circumferential edge. Therefore, the feature claimed in claim 5 of the subject application is different from the disclosures of Weber.

Examiner responds to Applicants' argument (h) by noting that Weber et al. invention of ejecting a drop from a cusped bore caused the tail to be attracted to the localized area of high surface tension at the cusped end of the orifice. Weber et al. further discloses that, as a result of the foregoing consideration, the tail breaks off at the cusp without being affected by orientation of the orifice over the firing chamber (Weber et al.: col.7, lines 15-21). Thus tail break-off is at a specific point on the aperture circumferential edge.

(i) Applicants argue that, regarding claim 6, in addition to the reasons recited above, Weber does not discloses an essentially saw tooth shaped section arranged at a portion of the edge of the circumference of the aperture as shown

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in FIG. 6 of the subject application.

Examiner responds to Applicants' argument (i) by referring Applicants to Weber et al., figure 10: showing multi-cusped orifice directed outwards.

(j) Applicants argue that, regarding claim 9, the Examiner indicates that Umehara teaches a printing fluid droplet tail release guide arrangement comprising a recessed section of essentially hemispherical shape in an inner surface wall of a nozzle chamber. After carefully studying Umehara's disclosure, Applicant deems that the Examiner might misunderstand Umehara's technical features. Please refer to FIG. 3 of Umehara and the relative descriptions, the reference number 41 indicates a nozzle, as can be seen, the inner wall of the nozzle does not have any recessed section. The reference numbers 33 and 37 ink outlet passage and through-passage, respectively. The ink outlet passage is formed by etching the ink supply plate from the upper and lower surfaces so as to have a first passage portion 33a and a second passage portion 33b (FIG. 4), each of which assumes a substantially semispherical shape. The feature and concept of Umehara are very different from the subject application. Umehara does not mention any printing fluid droplet tail release guide arrangement comprising a recessed section of essentially hemispherical shape in an inner surface wall of a nozzle chamber. Accordingly, claim 9 of the subject application should be patentable. Claim 21 recites the same limitations as claim 9. Therefore, claim 21 is also patentable for the same reasons stated above.

Examiner responds to Applicants argument (j) by acknowledging their careful analysis of the reference. However, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

While Applicants accurately state that Umehara's invention is not concerned with droplet tail break off, nonetheless Examiner believes that its disclosures meet claims 9 and 12. For example, the Examiner believes that Applicants' claimed recessed section of essentially hemispherical shape in an inner surface wall would, in fact, have to be the semispherical shape of Umehara's invention at figures 3 and 4.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER C. WITKOWSKI whose telephone number is (571) 270-3795. The examiner can normally be reached on Monday to Friday 8:00 AM to 6:30 PM EST, except alternate Thursdays and Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on 571-272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. C. W./
Examiner, Art Unit 2853

/Stephen D Meier/
Supervisory Patent Examiner, Art Unit 2853